



BTV04.2

Functional Description

SYSTEM200

Title

BTV04.2

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Purpose of Documentation This documentation describes ...

- the BTV04 hardware functions
- the technical data
- the wiring of a BTV04

Record of Revisions

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120-2100-B304-01/EN	09/98	First issue
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1 System Presentation

1.1 Preliminary Remarks

This description of functions is addressed to the users of the BTV04 miniature control panel. The functions of the connected controllers or applications are not described here.

1.2 Brief Description of the BTV04

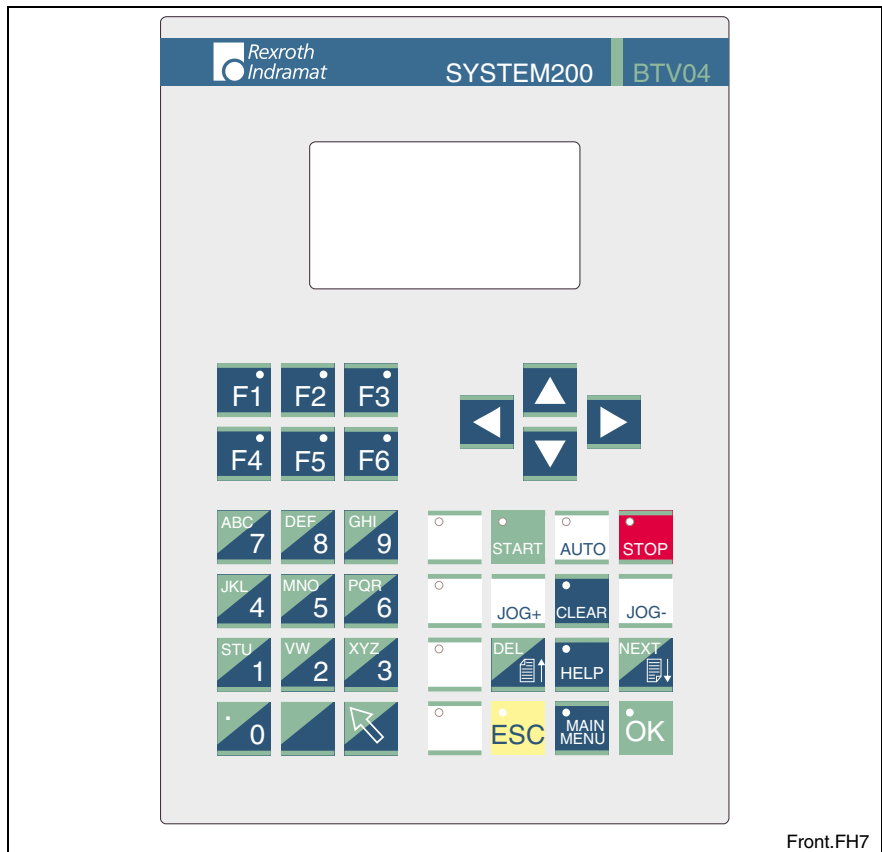


Fig. 1-1: BTV04 front view

The BTV04 miniature control panel provides a graphical user interface for machine handling.

Furthermore, the BTV05 convinces by the easy way it can be handled. This is achieved by a clearly structured keypad. The number of keys has been reduced to the most necessary functions.

In order to be able to communicate with other INDRAMAT controls or a PC, the BTV04 unit is equipped with a RS485 and a RS232 interface that complies with the INDRAMAT standard.

The function of seven keys on the keypad can be programmed by the user. Insert strips permit these keys to be labeled as required.

The universal ScreenManager software allows the user to create user-defined applications, which are able to access the variables of all INDRAMAT control families.

2 Important directions for use

2.1 Appropriate use

Introduction

Rexroth Indramat products represent state-of-the-art developments and manufacturing. They are tested prior to delivery to ensure operating safety and reliability.

The products may only be used in the manner that is defined as appropriate. If they are used in an inappropriate manner, then situations can develop that may lead to property damage or injury to personnel.

Note: Rexroth Indramat, as manufacturer, is not liable for any damages resulting from inappropriate use. In such cases, the guarantee and the right to payment of damages resulting from inappropriate use are forfeited. The user alone carries all responsibility of the risks.

Before using Rexroth Indramat products, make sure that all the prerequisites for appropriate use of the products are satisfied:

- Personnel that in any way, shape or form uses our products must first read and understand the relevant safety instructions and be familiar with appropriate use.
- If the product takes the form of hardware, then they must remain in their original state, in other words, no structural changes are permitted. It is not permitted to decompile software products or alter source codes.
- Do not mount damaged or faulty products or use them in operation.
- Make sure that the products have been installed in the manner described in the relevant documentation.

Areas of use and application

The BTV04.2 unit by Rexroth Indramat is designed for operating and controlling plant and machinery and in order to communicate the user visual information's about the operating plant.

Note: The BTV04.2 unit may only be used with the accessories and parts specified in this document. If a component has not been specifically named, then it may not be either mounted or connected. The same applies to cables and lines.

Operation is only permitted in the specified configurations and combinations of components using the software and firmware as specified in the relevant function descriptions.

The miniature control panel BTV04.2 is designed for use in one and multiple axes control tasks.

Typical areas of application of a BTV04.2 unit are:

- automation and handling
- packaging and food products and
- machine tools

The BTV04 unit may only be operated under the assembly, installation and ambient conditions as described here (temperature, system of protection, humidity, EMC requirements, etc.) and in the position specified.

2.2 Inappropriate use

Using the BTV04 unit outside of the above-referenced areas of application or under operating conditions other than described in the document and the technical data specified is defined as "inappropriate use".

The terminals may not be used if

- they are subject to operating conditions that do not meet the above specified ambient conditions. This includes, for example, operation under water, in the case of extreme temperature fluctuations or extreme maximum temperatures or if
- Rexroth Indramat has not specifically released them for that intended purpose. Please note the specifications outlined in the general Safety Instructions!

3 Safety Instructions for Electric Drives and Controls

3.1 Introduction

Read these instructions before the initial startup of the equipment in order to eliminate the risk of bodily harm or material damage. Follow these safety instructions at all times.

Do not attempt to install or start up this equipment without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation of the equipment prior to working with the equipment at any time. If you do not have the user documentation for your equipment, contact your local Rexroth Indramat representative to send this documentation immediately to the person or persons responsible for the safe operation of this equipment.

If the equipment is resold, rented or transferred or passed on to others, then these safety instructions must be delivered with the equipment.



Improper use of this equipment, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, may result in material damage, bodily harm, electric shock or even death!

3.2 Explanations

The safety instructions describe the following degrees of hazard seriousness in compliance with ANSI Z535. The degree of hazard seriousness informs about the consequences resulting from non-compliance with the safety instructions.

Warning symbol with signal word	Degree of hazard seriousness according to ANSI
	Death or severe bodily harm will occur.
	Death or severe bodily harm may occur.
	Bodily harm or material damage may occur.

Fig. 3-1: Hazard classification (according to ANSI Z535)

3.3 Hazards by Improper Use



DANGER

High voltage and high discharge current! Danger to life or severe bodily harm by electric shock!



DANGER

Dangerous movements! Danger to life, severe bodily harm or material damage by unintentional motor movements!



WARNING

High electrical voltage due to wrong connections! Danger to life or bodily harm by electric shock!



WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!



CAUTION

Surface of machine housing could be extremely hot! Danger of injury! Danger of burns!



CAUTION

Risk of injury due to improper handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock or incorrect handling of pressurized systems!



CAUTION

Risk of injury due to incorrect handling of batteries!

3.4 General Information

- Rexroth Indramat GmbH is not liable for damages resulting from failure to observe the warnings provided in this documentation.
- Read the operating, maintenance and safety instructions in your language before starting up the machine. If you find that you cannot completely understand the documentation for your product, please ask your supplier to clarify.
- Proper and correct transport, storage, assembly and installation as well as care in operation and maintenance are prerequisites for optimal and safe operation of this equipment.
- Only persons who are trained and qualified for the use and operation of the equipment may work on this equipment or within its proximity.

The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the equipment as well as an understanding of all warnings and precautionary measures noted in these instructions.

Furthermore, they must be trained, instructed and qualified to switch electrical circuits and equipment on and off in accordance with technical safety regulations, to ground them and to mark them according to the requirements of safe work practices. They must have adequate safety equipment and be trained in first aid.

- Only use spare parts and accessories approved by the manufacturer.
- Follow all safety regulations and requirements for the specific application as practiced in the country of use.
- The equipment is designed for installation in industrial machinery.
- The ambient conditions given in the product documentation must be observed.
- Use only safety features and applications that are clearly and explicitly approved in the Project Planning Manual.
For example, the following areas of use are not permitted: construction cranes, elevators used for people or freight, devices and vehicles to transport people, medical applications, refinery plants, transport of hazardous goods, nuclear applications, applications sensitive to high frequency, mining, food processing, control of protection equipment (also in a machine).
- The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.

The machine and installation manufacturer must

make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,

make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.

- Startup of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards of the application.

- Operation is only permitted if the national EMC regulations for the application are met.
The instructions for installation in accordance with EMC requirements can be found in the documentation "EMC in Drive and Control Systems".
The machine or installation manufacturer is responsible for compliance with the limiting values as prescribed in the national regulations.
- Technical data, connections and operational conditions are specified in the product documentation and must be followed at all times.

3.5 Protection Against Contact with Electrical Parts

Note: This section refers to equipment and drive components with voltages above 50 Volts.

Touching live parts with voltages of 50 Volts and more with bare hands or conductive tools or touching ungrounded housings can be dangerous and cause electric shock. In order to operate electrical equipment, certain parts must unavoidably have dangerous voltages applied to them.



DANGER

High electrical voltage! Danger to life, severe bodily harm by electric shock!

- ⇒ Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain or repair this equipment.
 - ⇒ Follow general construction and safety regulations when working on high voltage installations.
 - ⇒ Before switching on power the ground wire must be permanently connected to all electrical units according to the connection diagram.
 - ⇒ Do not operate electrical equipment at any time, even for brief measurements or tests, if the ground wire is not permanently connected to the points of the components provided for this purpose.
 - ⇒ Before working with electrical parts with voltage higher than 50 V, the equipment must be disconnected from the mains voltage or power supply. Make sure the equipment cannot be switched on again unintended.
 - ⇒ The following should be observed with electrical drive and filter components:
 - ⇒ Wait five (5) minutes after switching off power to allow capacitors to discharge before beginning to work. Measure the voltage on the capacitors before beginning to work to make sure that the equipment is safe to touch.
 - ⇒ Never touch the electrical connection points of a component while power is turned on.
 - ⇒ Install the covers and guards provided with the equipment properly before switching the equipment on. Prevent contact with live parts at any time.
 - ⇒ A residual-current-operated protective device (RCD) must not be used on electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device.
 - ⇒ Electrical components with exposed live parts and uncovered high voltage terminals must be installed in a protective housing, for example, in a control cabinet.
-

To be observed with electrical drive and filter components:



DANGER

**High electrical voltage on the housing!
High leakage current! Danger to life, danger of
injury by electric shock!**

- ⇒ Connect the electrical equipment, the housings of all electrical units and motors permanently with the safety conductor at the ground points before power is switched on. Look at the connection diagram. This is even necessary for brief tests.
- ⇒ Connect the safety conductor of the electrical equipment always permanently and firmly to the supply mains. Leakage current exceeds 3.5 mA in normal operation.
- ⇒ Use a copper conductor with at least 10 mm² cross section over its entire course for this safety conductor connection!
- ⇒ Prior to startups, even for brief tests, always connect the protective conductor or connect with ground wire. Otherwise, high voltages can occur on the housing that lead to electric shock.

3.6 Protection Against Electric Shock by Protective Low Voltage (PELV)

All connections and terminals with voltages between 0 and 50 Volts on Rexroth Indramat products are protective low voltages designed in accordance with international standards on electrical safety.



WARNING

High electrical voltage due to wrong connections! Danger to life, bodily harm by electric shock!

- ⇒ Only connect equipment, electrical components and cables of the protective low voltage type (PELV = Protective Extra Low Voltage) to all terminals and clamps with voltages of 0 to 50 Volts.
- ⇒ Only electrical circuits may be connected which are safely isolated against high voltage circuits. Safe isolation is achieved, for example, with an isolating transformer, an opto-electronic coupler or when battery-operated.

3.7 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of the connected motors. Some common examples are:

- improper or wrong wiring of cable connections
- incorrect operation of the equipment components
- wrong input of parameters before operation
- malfunction of sensors, encoders and monitoring devices
- defective components
- software or firmware errors

Dangerous movements can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

The monitoring in the drive components will normally be sufficient to avoid faulty operation in the connected drives. Regarding personal safety, especially the danger of bodily injury and material damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

**DANGER**

Dangerous movements! Danger to life, risk of injury, severe bodily harm or material damage!

- ⇒ Ensure personal safety by means of qualified and tested higher-level monitoring devices or measures integrated in the installation. Unintended machine motion is possible if monitoring devices are disabled, bypassed or not activated.
- ⇒ Pay attention to unintended machine motion or other malfunction in any mode of operation.

- ⇒ Keep free and clear of the machine's range of motion and moving parts. Possible measures to prevent people from accidentally entering the machine's range of motion:
 - use safety fences
 - use safety guards
 - use protective coverings
 - install light curtains or light barriers
- ⇒ Fences and coverings must be strong enough to resist maximum possible momentum, especially if there is a possibility of loose parts flying off.
- ⇒ Mount the emergency stop switch in the immediate reach of the operator. Verify that the emergency stop works before startup. Don't operate the machine if the emergency stop is not working.
- ⇒ Isolate the drive power connection by means of an emergency stop circuit or use a starting lockout to prevent unintentional start.
- ⇒ Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone. Safe standstill can be achieved by switching off the power supply contactor or by safe mechanical locking of moving parts.
- ⇒ Secure vertical axes against falling or dropping after switching off the motor power by, for example:
 - mechanically securing the vertical axes
 - adding an external braking/ arrester/ clamping mechanism
 - ensuring sufficient equilibration of the vertical axes

The standard equipment motor brake or an external brake controlled directly by the drive controller are not sufficient to guarantee personal safety!

- ⇒ Disconnect electrical power to the equipment using a master switch and secure the switch against reconnection for:
 - maintenance and repair work
 - cleaning of equipment
 - long periods of discontinued equipment use
 - ⇒ Prevent the operation of high-frequency, remote control and radio equipment near electronics circuits and supply leads. If the use of such equipment cannot be avoided, verify the system and the installation for possible malfunctions in all possible positions of normal use before initial startup. If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.
-

3.8 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated near current-carrying conductors and permanent magnets in motors represent a serious health hazard to persons with heart pacemakers, metal implants and hearing aids.



WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!

- ⇒ Persons with heart pacemakers, hearing aids and metal implants are not permitted to enter the following areas:
 - Areas in which electrical equipment and parts are mounted, being operated or started up.
 - Areas in which parts of motors with permanent magnets are being stored, operated, repaired or mounted.
 - ⇒ If it is necessary for a person with a heart pacemaker to enter such an area, then a doctor must be consulted prior to doing so. Heart pacemakers that are already implanted or will be implanted in the future, have a considerable variation in their electrical noise immunity. Therefore there are no rules with general validity.
 - ⇒ Persons with hearing aids, metal implants or metal pieces must consult a doctor before they enter the areas described above. Otherwise, health hazards will occur.
-

3.9 Protection Against Contact with Hot Parts



CAUTION

Housing surfaces could be extremely hot! Danger of injury! Danger of burns!

- ⇒ Do not touch housing surfaces near sources of heat! Danger of burns!
- ⇒ After switching the equipment off, wait at least ten (10) minutes to allow it to cool down before touching it.
- ⇒ Do not touch hot parts of the equipment, such as housings with integrated heat sinks and resistors. Danger of burns!

3.10 Protection During Handling and Mounting

Under certain conditions, incorrect handling and mounting of parts and components may cause injuries.



CAUTION

Risk of injury by incorrect handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock!

- ⇒ Observe general installation and safety instructions with regard to handling and mounting.
- ⇒ Use appropriate mounting and transport equipment.
- ⇒ Take precautions to avoid pinching and crushing.
- ⇒ Use only appropriate tools. If specified by the product documentation, special tools must be used.
- ⇒ Use lifting devices and tools correctly and safely.
- ⇒ For safe protection wear appropriate protective clothing, e.g. safety glasses, safety shoes and safety gloves.
- ⇒ Never stand under suspended loads.
- ⇒ Clean up liquids from the floor immediately to prevent slipping.

3.11 Battery Safety

Batteries contain reactive chemicals in a solid housing. Inappropriate handling may result in injuries or material damage.



Risk of injury by incorrect handling!

- ⇒ Do not attempt to reactivate discharged batteries by heating or other methods (danger of explosion and cauterization).
- ⇒ Never charge non-chargeable batteries (danger of leakage and explosion).
- ⇒ Never throw batteries into a fire.
- ⇒ Do not dismantle batteries.
- ⇒ Do not damage electrical components installed in the equipment.

Note: Be aware of environmental protection and disposal! The batteries contained in the product should be considered as hazardous material for land, air and sea transport in the sense of the legal requirements (danger of explosion). Dispose batteries separately from other waste. Observe the legal requirements in the country of installation.

3.12 Protection Against Pressurized Systems

Certain motors and drive controllers, corresponding to the information in the respective Project Planning Manual, must be provided with pressurized media, such as compressed air, hydraulic oil, cooling fluid and cooling lubricant supplied by external systems. Incorrect handling of the supply and connections of pressurized systems can lead to injuries or accidents. In these cases, improper handling of external supply systems, supply lines or connections can cause injuries or material damage.



Danger of injury by incorrect handling of pressurized systems !

- ⇒ Do not attempt to disassemble, to open or to cut a pressurized system (danger of explosion).
- ⇒ Observe the operation instructions of the respective manufacturer.
- ⇒ Before disassembling pressurized systems, release pressure and drain off the fluid or gas.
- ⇒ Use suitable protective clothing (for example safety glasses, safety shoes and safety gloves)
- ⇒ Remove any fluid that has leaked out onto the floor immediately.

Note: Environmental protection and disposal! The media used in the operation of the pressurized system equipment may not be environmentally compatible. Media that are damaging the environment must be disposed separately from normal waste. Observe the legal requirements in the country of installation.

Notes

4 BTV04 Features

4.1 Enclosure, Control and Display Elements

- Aluminum front panel with 38 keys
- 128 x 64 pixel high-contrast graphical LC display with LED back lighting and dark mode
- Impact-resistant ergonomic IP65-rated enclosure
- Plug-in connecting cable
- 9 machine control keys with LEDs
- 7 machine control keys with LEDs, insert strips for customized labeling

4.2 Hardware Features

- Series 68000 microcontroller
- 1 MByte flash memory
- 512 KByte RAM
- RS232 and RS485 Indramat standard interfaces
- 10 x 24 V inputs, 11 x 24 V outputs for external wiring

4.3 Communication Interfaces

- The BTV04 unit features 2 serial interfaces (not isolated !):
- COM 1: According to Indramat standard, i.e. RS485 interface with bus capability
- COM 2: RS232 interface

5 Technical Data

5.1 General Technical Data

BTV04 base unit	
Power supply	24 V (18...30 V) DC
Current consumption	max. 400 mA
Display	LCD 128 x 64 pixels, black-and-white, full graphical capability, CFL back lighting visible area 68 x 37 mm
Keypad	Polyester foil with 38 keys, 7 inscribable
Material front plate	Aluminum
protection category	IP 65 (front); IP20 (housing)
Weight	approximately 1.7 kg with mounting frame
Dimensions (WxHxD)	203 x 143 x 45 mm 203 x 143 x 50 mm (with mounting frame)
Color	light gray (RAL7035)
24 V Inputs	U_{IN} = typ. 18-30 V potential-free I_{IN} = min. 7 mA
24 V Outputs	U_{OUT} = typ. 18-30 V potential-free I_{OUT} = typ. 200 mA

Fig. 5-1: General technical data

5.2 Ambient Conditions

	During operation	During storage/transport
Maximum ambient temperature	+5 °C ... +45 °C	-20 °C ... +60 °C
Maximum temperature gradient	10 K/h	15 K/h
Relative humidity	75 % average, 80 % occasional	no condensation, DIN 40 040 class F
Air pressure	860 ... 1060 hPa, 1500m	12000m
Max. vibration	5-55 Hz +/-0,075 mm sinus 3 axis 55-500 Hz 1 g sinus 3 axis (according to norm EN60068-2-6)	
Max. shock	15 g 11 ms (half sinus)	

Fig. 5-2: BTV04 - ambient conditions

6 Housing Dimensions

6.1 Outside Dimensions

Front View

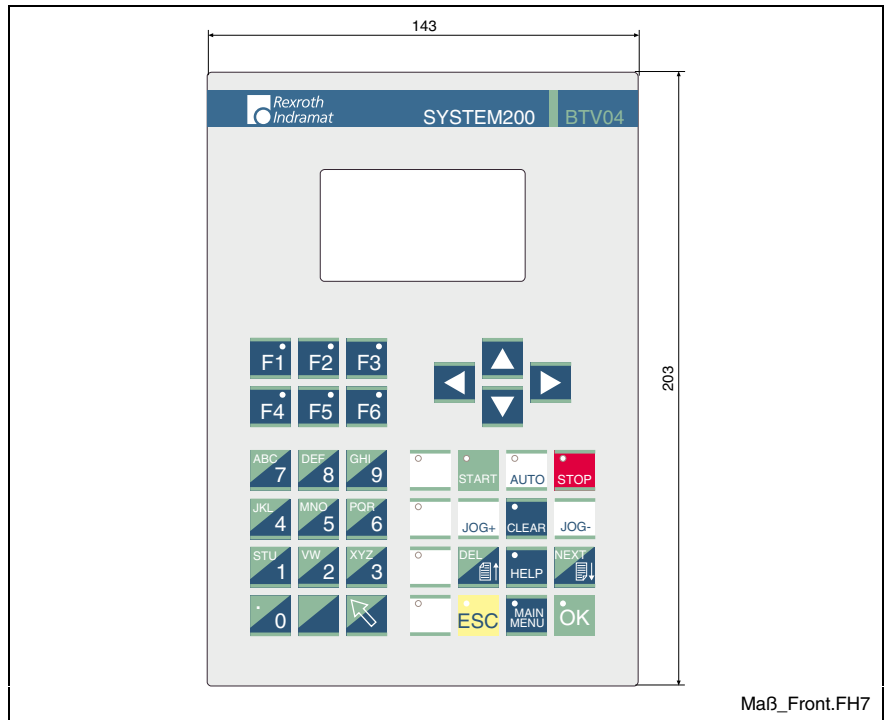


Fig. 6-1: Front panel dimensions

Rear View

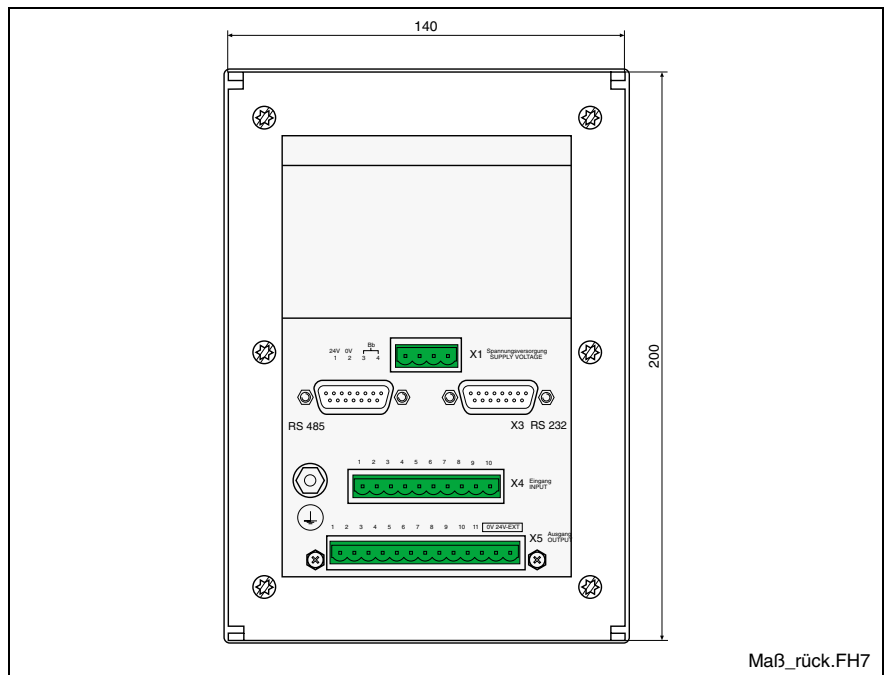


Fig. 6-2: Rear panel dimensions

Side View

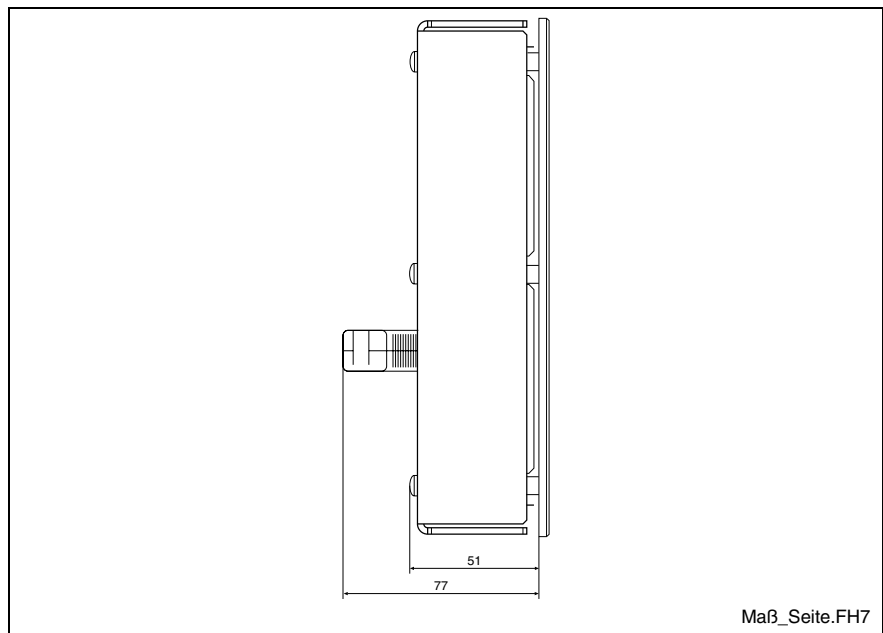


Fig. 6-3: Side view dimensions

6.2 Mounting Dimensions

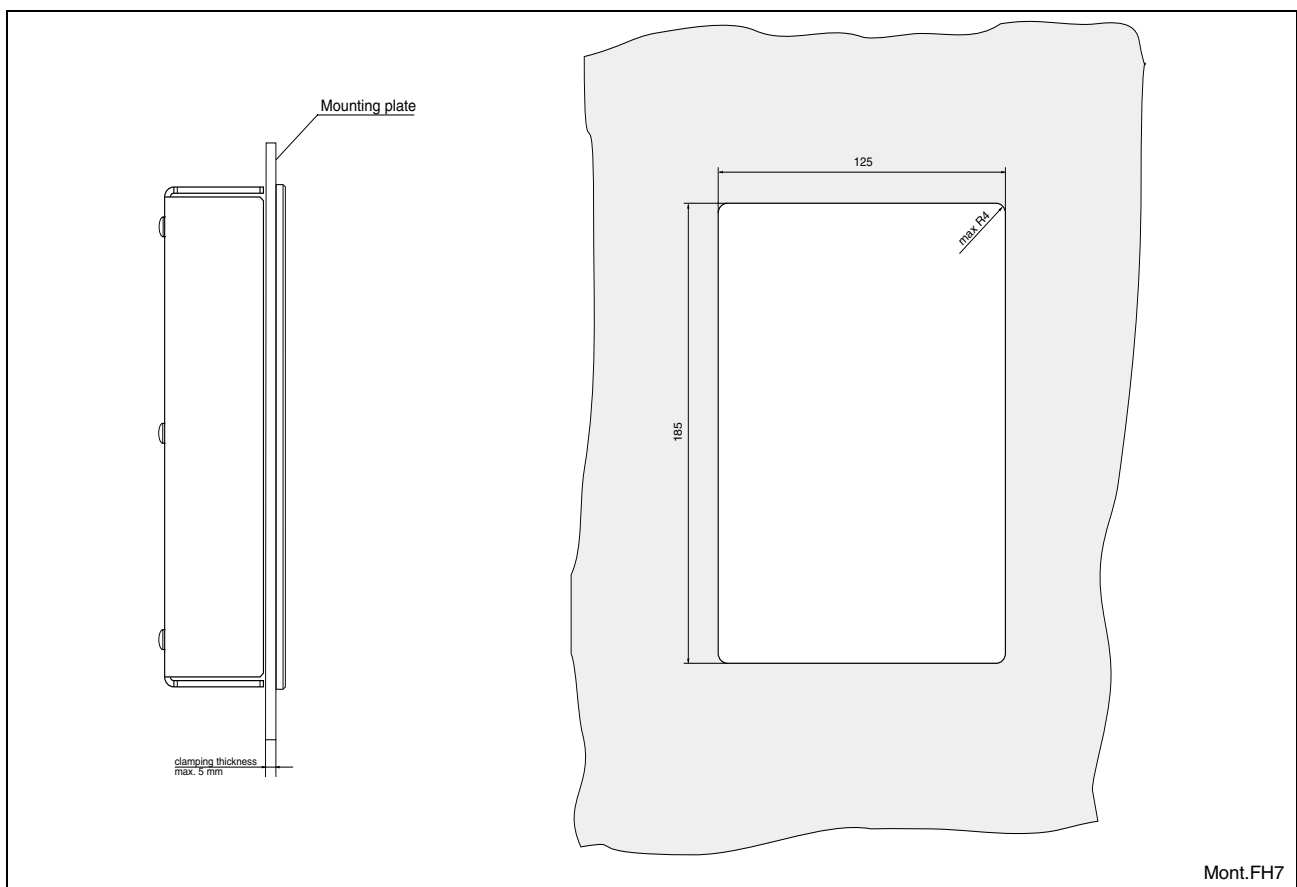


Fig. 6-4: Panel cutout

7 Connections

7.1 General Connections

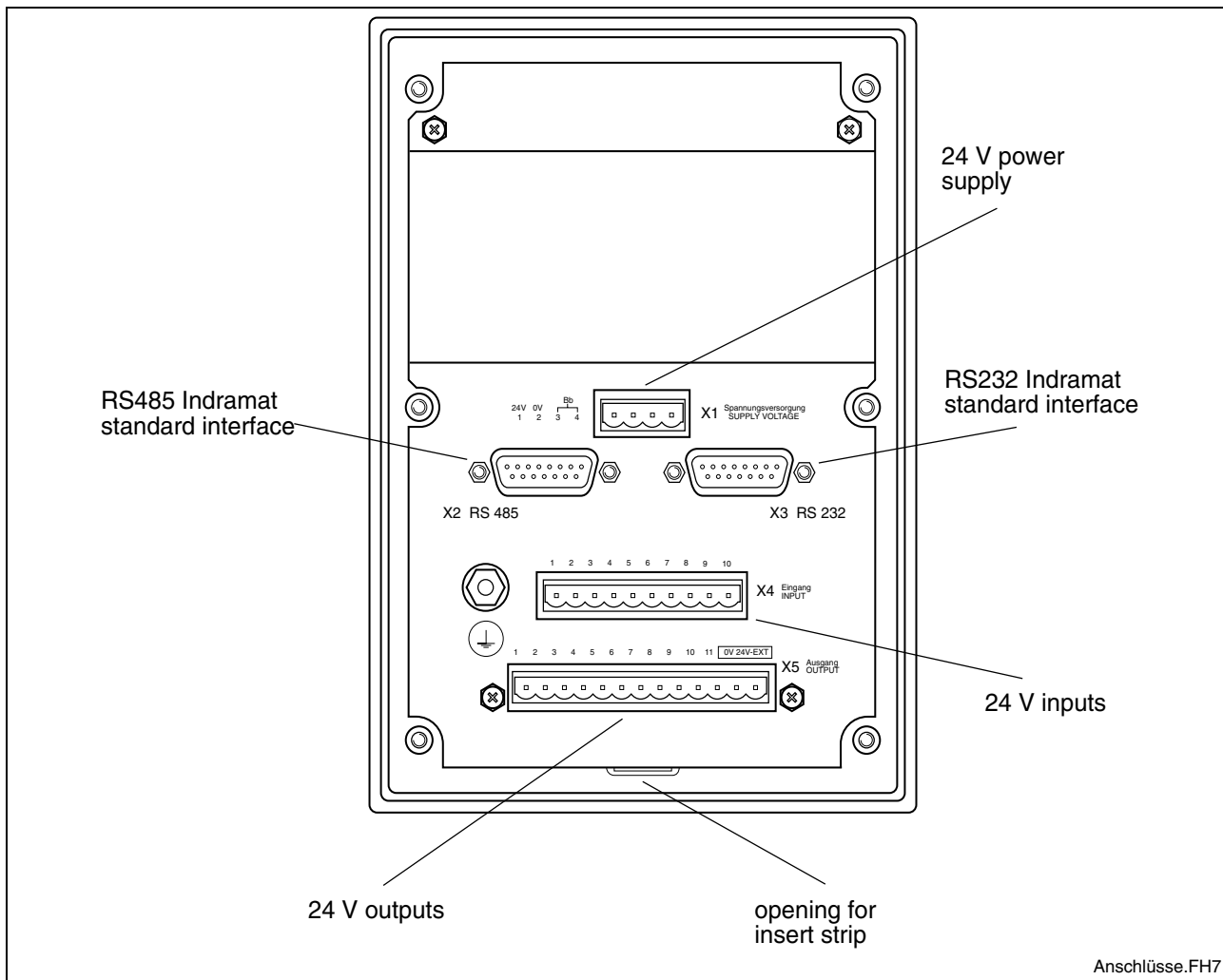


Fig. 7-1: Connections of the BTV04 unit

7.2 Connector Pin Assignment

Power Supply X1

Pin	Signal name
1	24 V
2	0 V
3 + 4	Floating relay contact, load capacity 24V, 150mA

Fig. 7-2: Connector pin assignments of power supply X1

Indramat Standard Interface X2 and X3

RS485 X2

Pin	Signal name
4	RS485 RxD/TxD +
5	RS485 RxD/TxD -
7	Signal Ground
10	GND
12	+ 5V

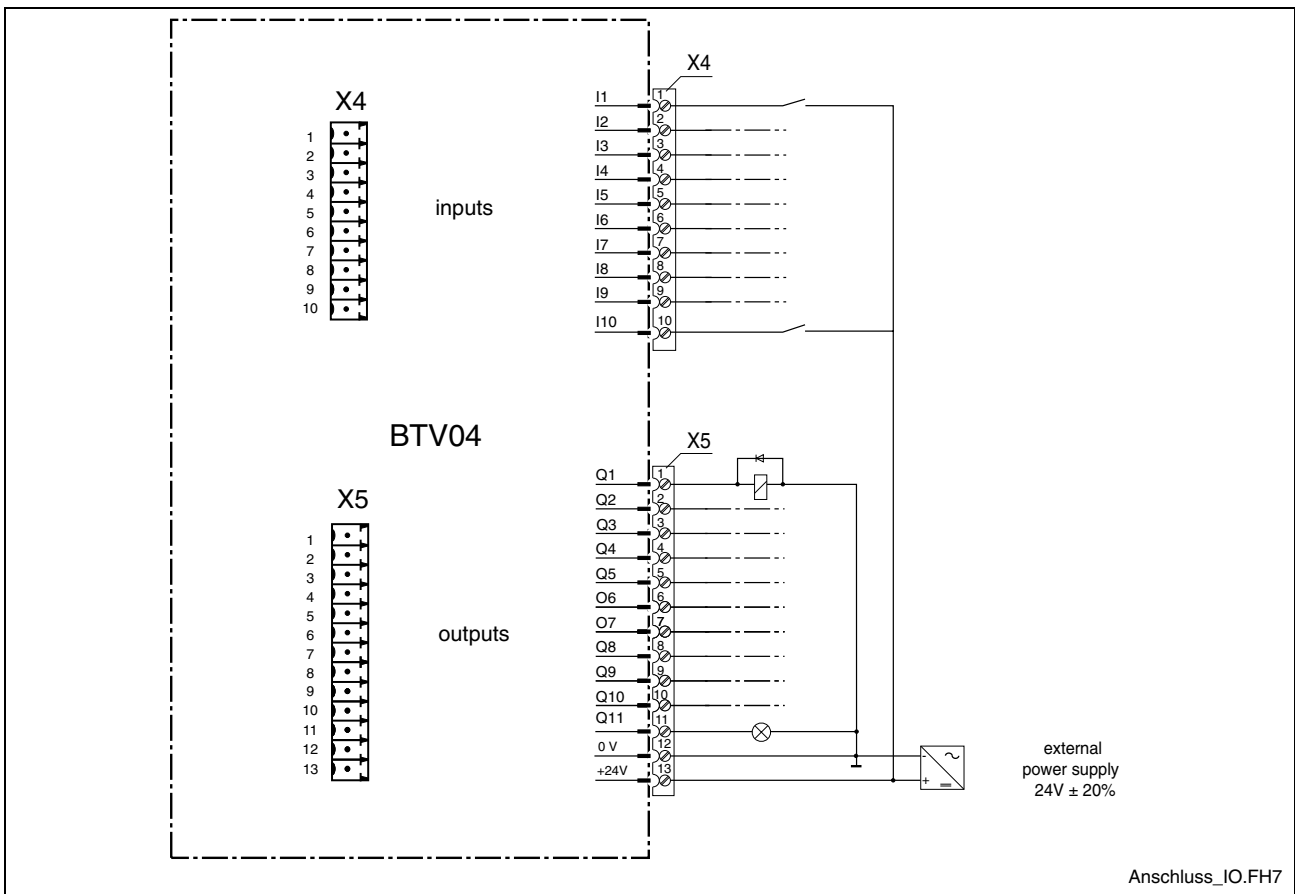
Fig. 7-3: Connector pin assignments of X2

RS232 X3

Pin	Signal name
2	TxD
3	RxD
7	Signal Ground
13	RTS
14	CTS

Fig. 7-4: Connector pin assignments of X3

24 V Inputs and Outputs (X4 and X5)



Anschluss_IO.FH7

Fig. 7-5: Connection possibility of the 24 V inputs and outputs

Pin	Signal name
1	I 1
3	I 3
5	I 5
7	I 7
9	I 9

Pin	Signal name
2	I 2
4	I 4
6	I 6
8	I 8
10	I 10

Fig. 7-6: Inputs 24 V (X4)

Pin	Signal name
1	Q 1
3	Q 3
5	Q 5
7	Q 7
9	Q 9
11	Q 11
13	+U _L

Pin	Signal name
2	Q 2
4	Q 4
6	Q 6
8	Q 8
10	Q 10
12	0 V

Fig. 7-7: Outputs 24 V (X5)

Note: 24 V inputs and outputs are isolated.

7.3 Typical Applications

Connection to MTC200-P / MTA200-P / ISP200-P

RS485 on X40 and X41 (MTS-P01.1)

Max. two BTVs on an interface

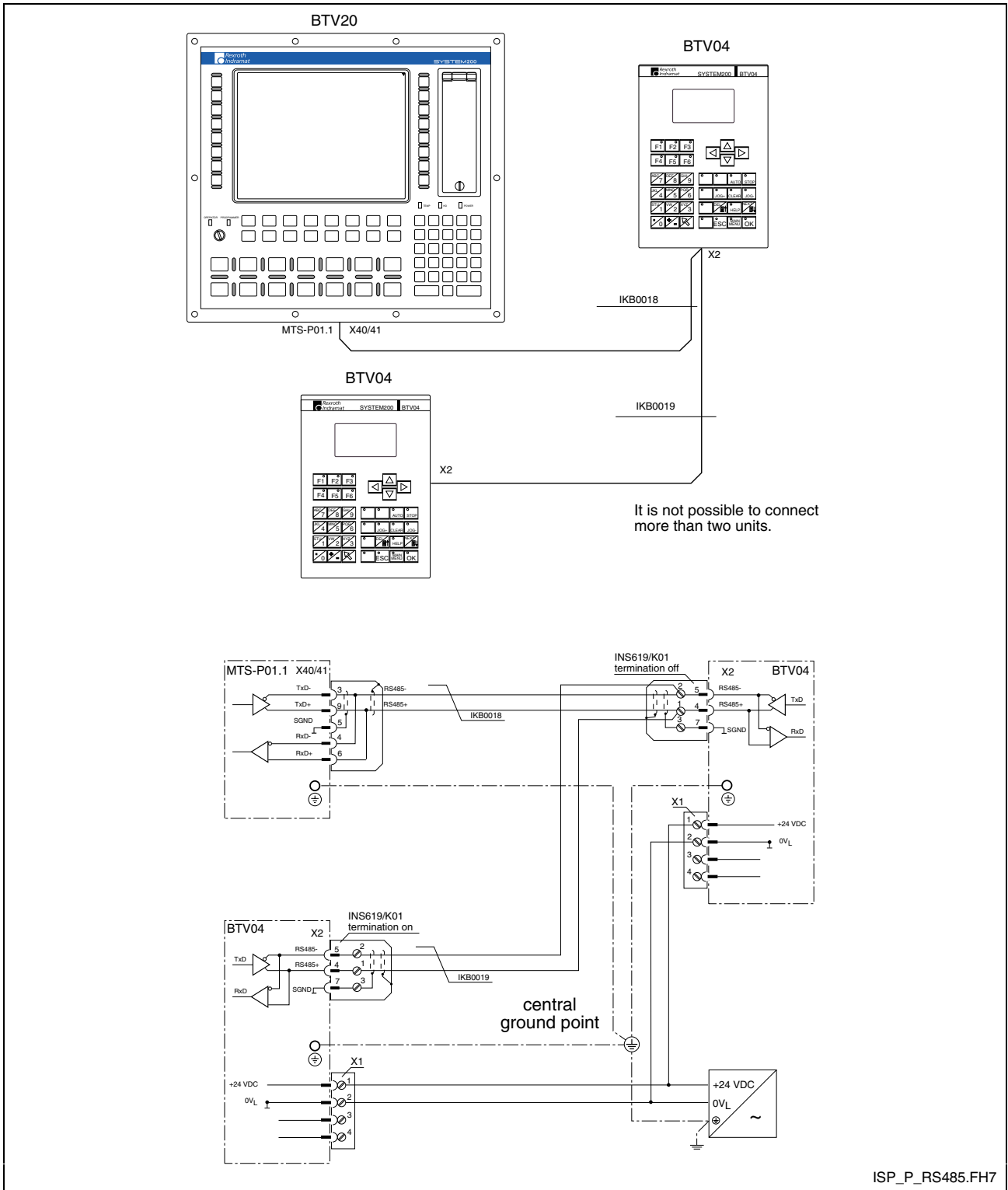


Fig. 7-8: Connecting to the MTS-P01.1 of the BTV20

RS485 on X16 (MTS-P01.2)

Max. two BTVs on an interface

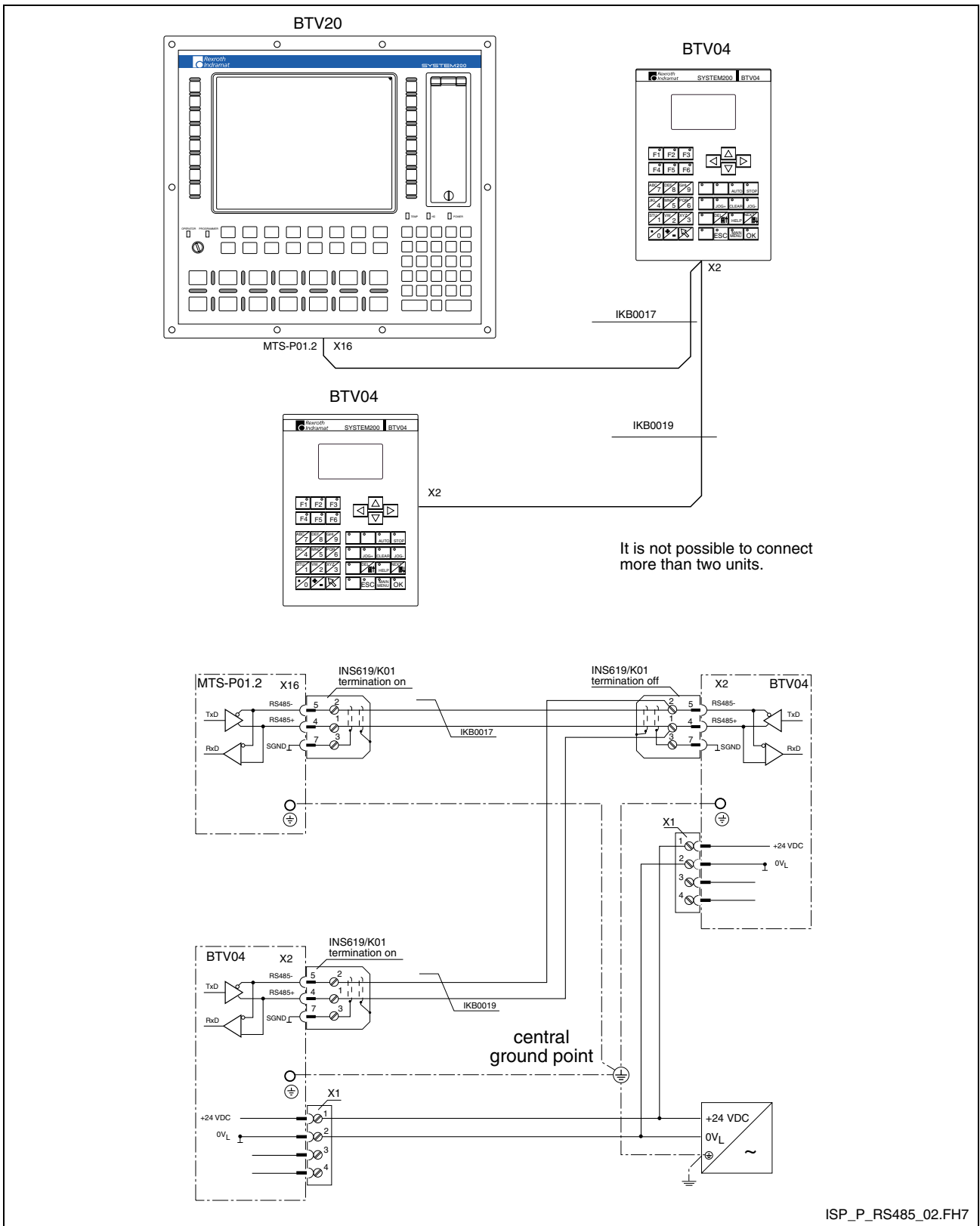


Fig. 7-9: Connecting to the MTS-P01.2 of the BTV20

Connection to MTC200-R / ISP200-R

RS485 on X16

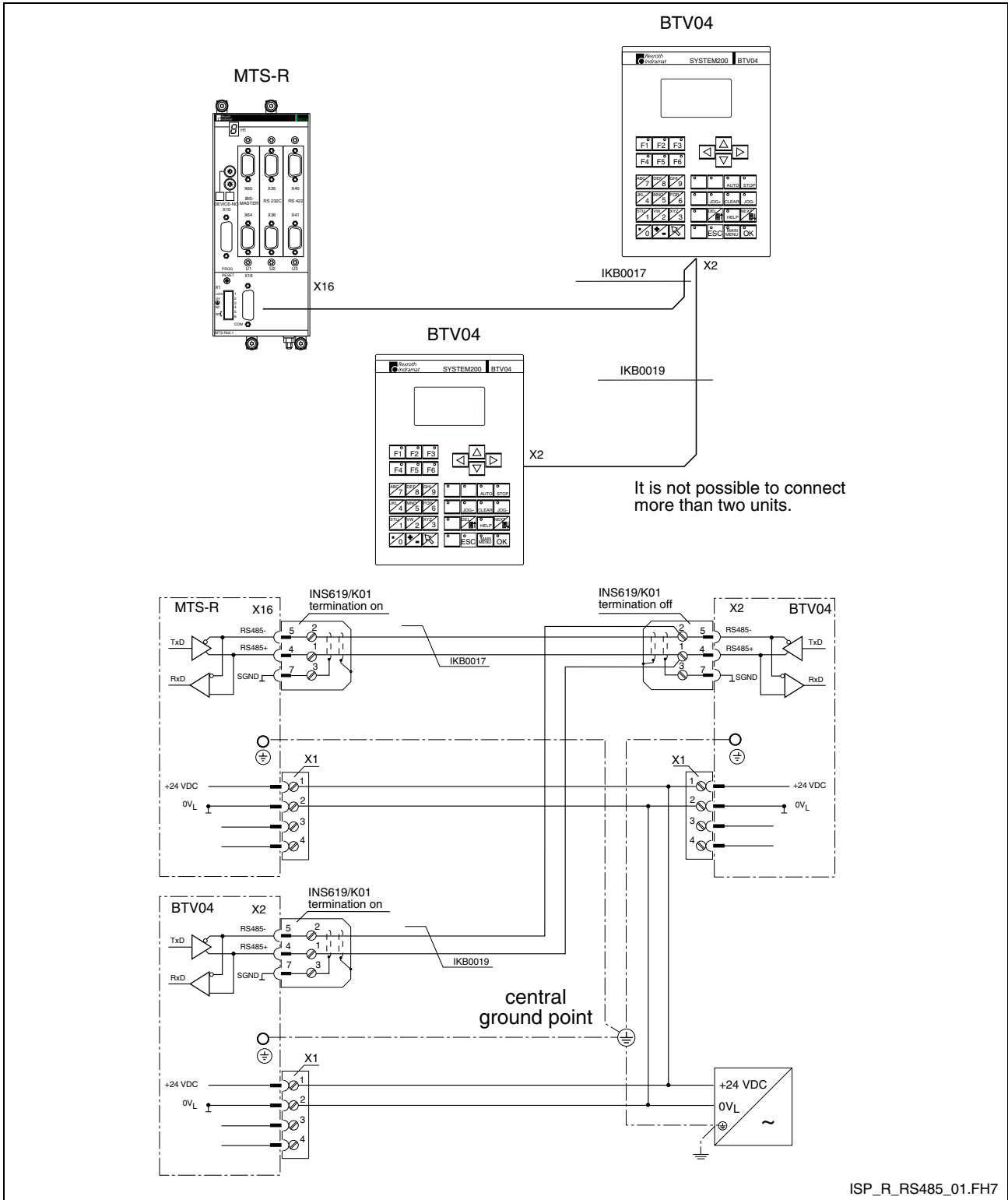


Fig. 7-10: Connecting to the MTS-R (X16)

RS485 on X40 and X41

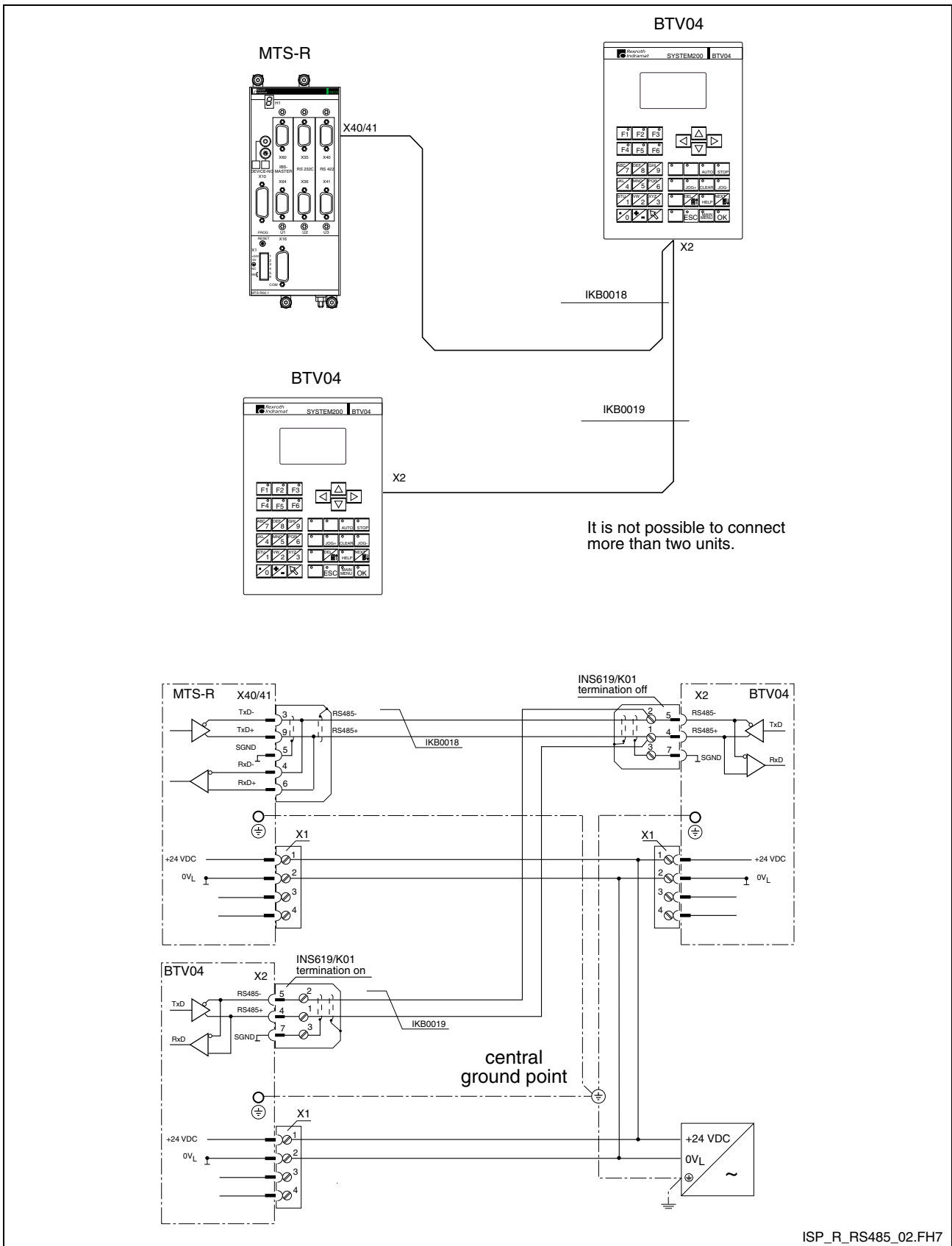
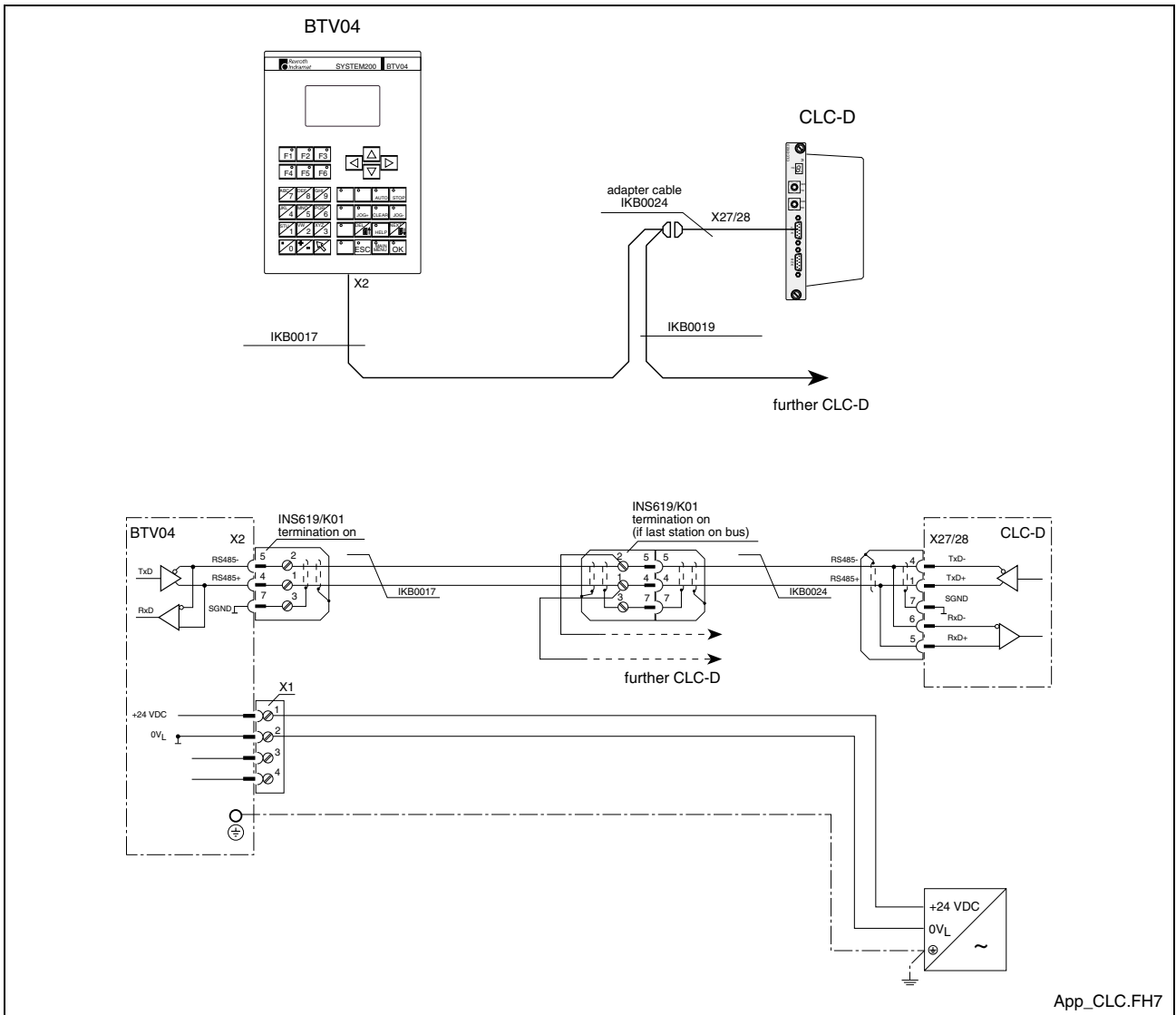


Fig. 7-11: Connecting to the MTS-R (X40/41)

Connection to CLC-D

One BTV on a Bus

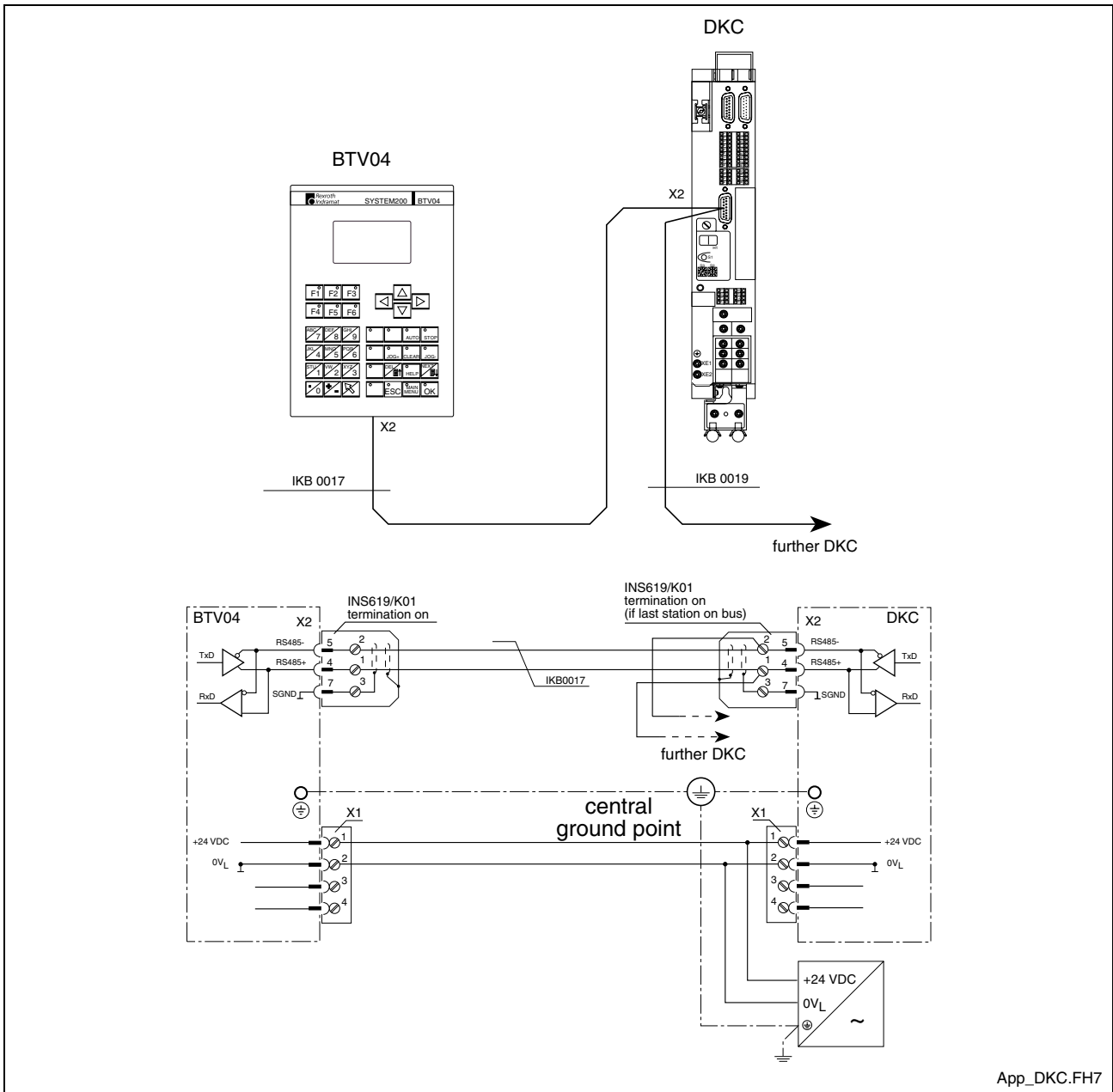


App_CLC.FH7

Fig. 7-12: Connecting to the CLC-D

Connection to Ecodrive3 / ELC

One BTV on a Bus



App_DKC.FH7

Fig. 7-13: Connecting to the Ecodrive3 (DKC) and ELC

Connection to PPC-R

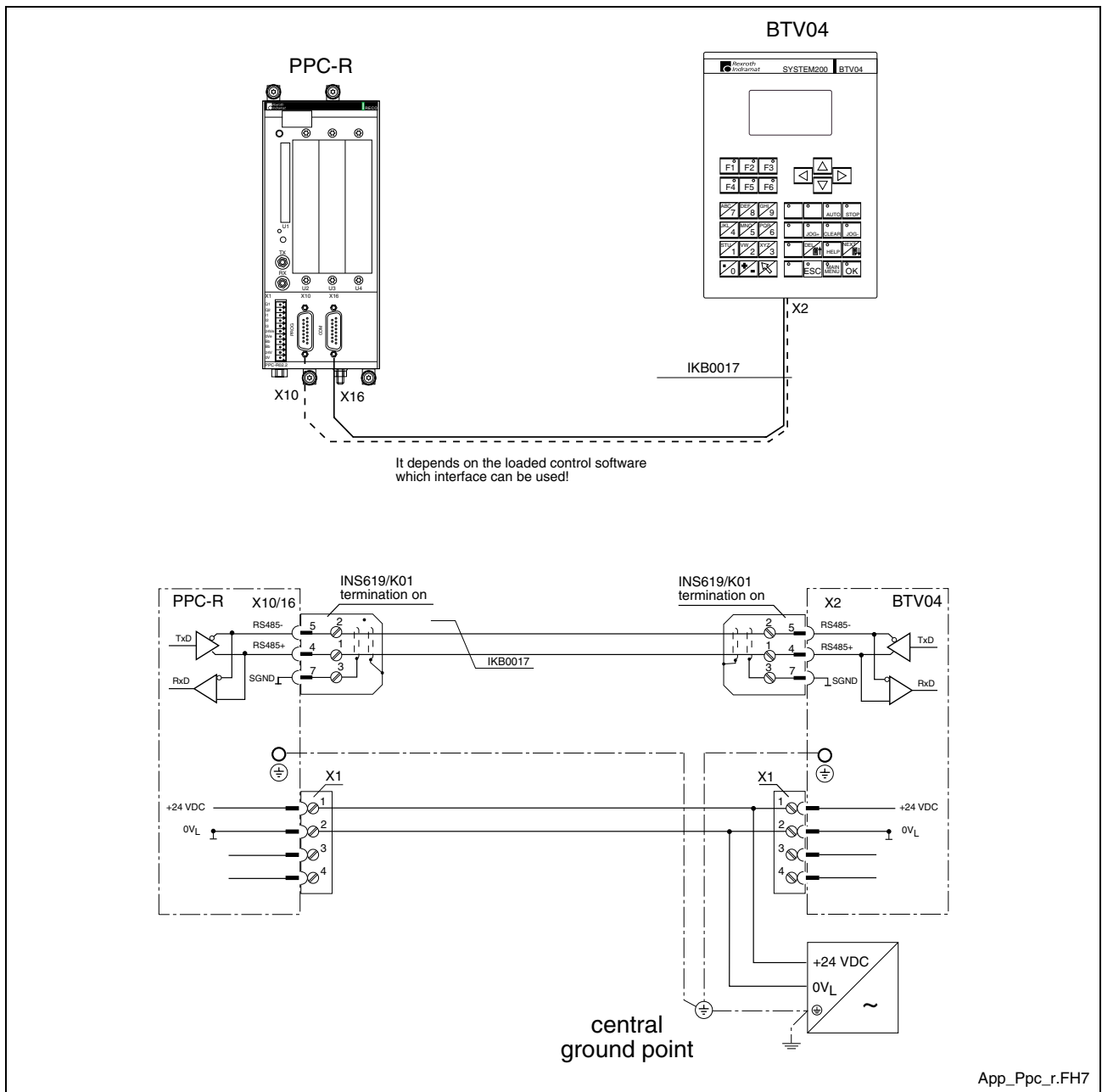


Fig. 7-14: Connecting to PPC-R

Connection to CLM

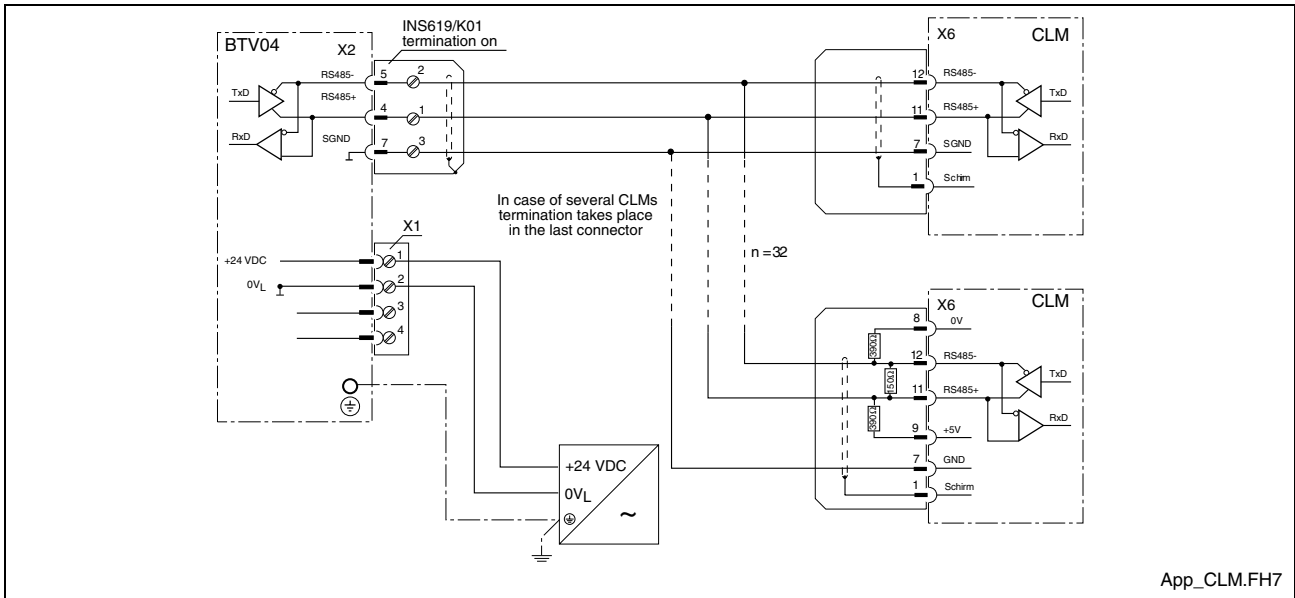


Fig. 7-15: Connecting to CLM

Connection to DLC

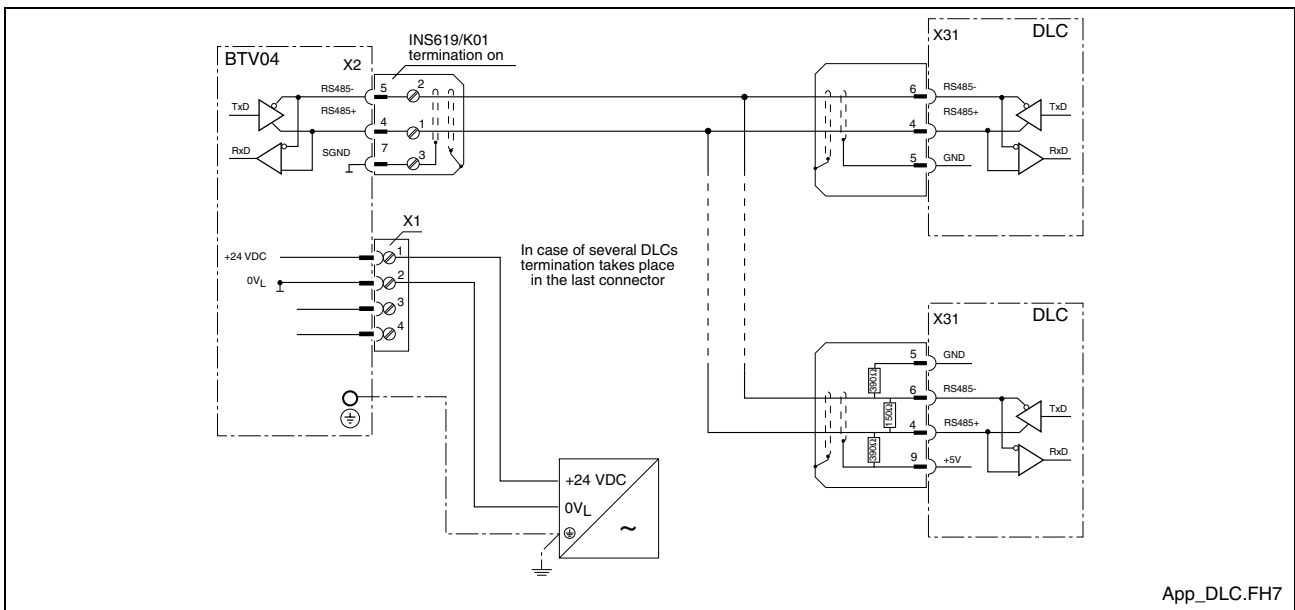


Fig. 7-16: Connecting to DLC

Required interface connector

There is a special connector with integrated termination resistors for the RS485 communication. The connector can be fixed to the cable with a screw terminal. The figure below shows the pin assignment of the connector:

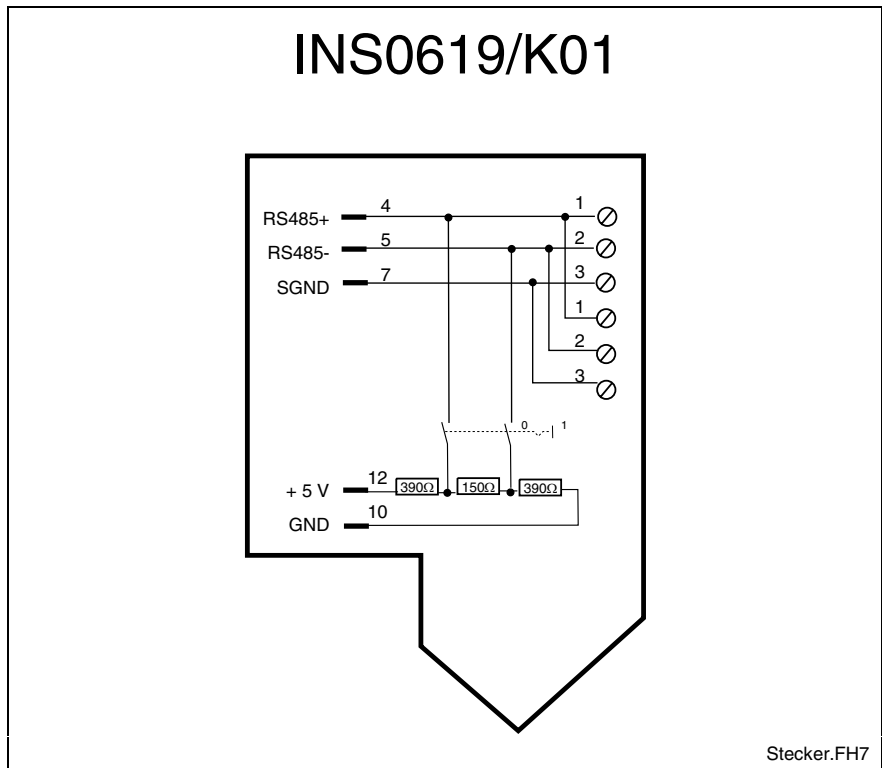


Fig. 7-17: Connector pin assignment of the required interface connector

As required, the termination can be turned on by switch.

In chapter 9.2 (Accessories) you find a table containing the necessary interface cables and the connector.

8 Commissioning

After the unit has been switched on for the first time, the firmware that comes with the unit on floppy disks must be loaded into the unit. To do this, you must connect the unit to a PC via the RS232 cable IKB0012.

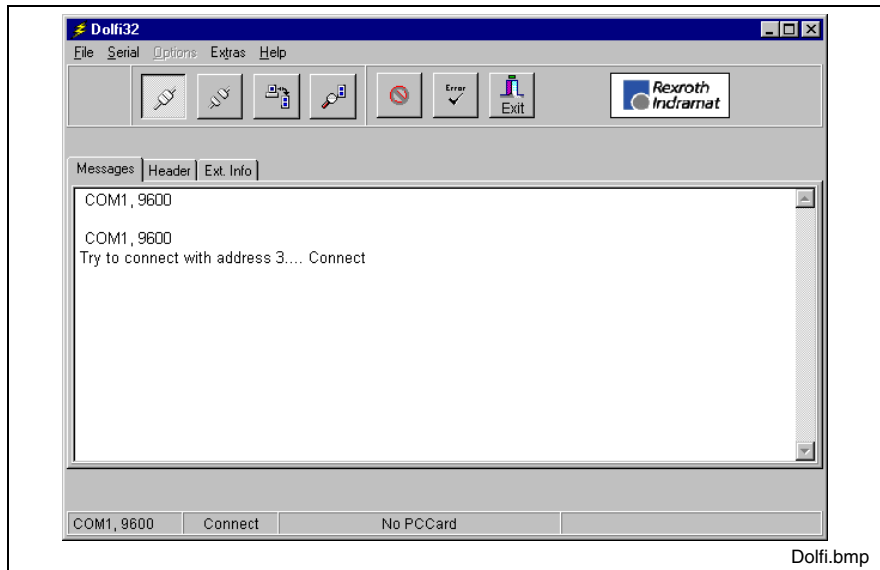


Fig. 8-1: INDRAMAT Flashtool "Dolfi"

8.1 Brief Description of the First-Time Commissioning Procedure

What do you need?

To put the unit into operation, you need the following items:

- (1) An operational BTV04 unit that is connected with the system that shall be controlled, and is fed with the 24 V operating voltage.
- (2) The PC connecting cable IKB0012
- (3) The application software for the BTV04 unit on floppy disk.
- (4) A PC with Windows 3.11 or a 32-Bit Windows (e.g. 95, 98 or NT) and the INDRAMAT flash loading tool "Dolfi" installed (included in the scope of delivery of the BTV04 application software).

What is to be done?

To load the software, use the following procedure:

- (1) Connect the BTV04 unit with a PC via the PC connecting cable.
- (2) Provide the BTV04 unit with power (switch on the control voltage).
- (3) Start Flashtool Dolfi on the PC and click on the "Messages" field there.
- (4) Select the menu item "Options - COM-Port":
 Select the COM port
 Select a baud rate of 9600 bits/s (default value)
 Set the download baud rate to 38,400 bits/s
 Address for receiver = 03 (default)
- (5) Select the menu item "Serial - Connect".

- (6) Select the menu item "Serial - Send". Use the "Open" dialog to select the required software.
- (7) **In the case of a software update, you should always make a backup copy of the software that is contained in the unit. To do this, select the option "Backup" from the subsequent "Send" dialog. To confirm the two subsequent dialogs, click on "Save" and "OK".** This starts the backup process. Its progress is shown by a moving bar at the bottom margin. To start the download process proper, you must again select the "Serial - Send" menu item and choose the software.
- (8) Click on "Send" to confirm the "Send" dialog. This starts the download process. Its progress is shown by a moving bar at the bottom margin.
- (9) Once the download has successfully been completed, Dolfi issues the message "Programming all modules successfully, restart with Serial - Disconnect".
- (10) The "Serial - Disconnect" menu item clears down the connection BTV04 - PC and starts the application software in the BTV04 unit for the first time.

The loaded software will now always be started automatically when the BTV04 supply voltage is applied.

8.2 Functions of the BTV04 Bootloader

Procedures After Power-Up

First of all, the Indramat logo appears on the screen, and all 7 LEDs of the BTV04 unit are ON.



Fig. 8-2: Screen after power-on

The bootloader searches the flash memory for existing software. This process is commented by the footer line „test program CRC“. The search is performed by interrogating the program header and verifying the CRC checksums. A header is a program element that contains information about the employed hardware and firmware. If, for example, firmware has not yet been loaded when first-time commissioning is started, or if the memory content is corrupted, only the bootloader itself will be recognized. The message "dolfi loader active" is displayed in this case and the unit is immediately ready for receiving software from the PC.

Hinweis: Once a valid software has been loaded, the LEDs are extinguished one by one and the software is started. Up to this point in time you can still press and release the F1 key to abort the software startup and to remain in the Dolfi Loader. The display then shows the versions of bootloader and loaded software (service mode).

8.3 Dolfi Functions

The Dolfi user interface is used for loading the delivered software via the RS232 interface of the BTV04 unit into the unit. Please refer to the documentation that comes with the Dolfi product for a detailed description of the Dolfi functions.

Messages from Dolfi

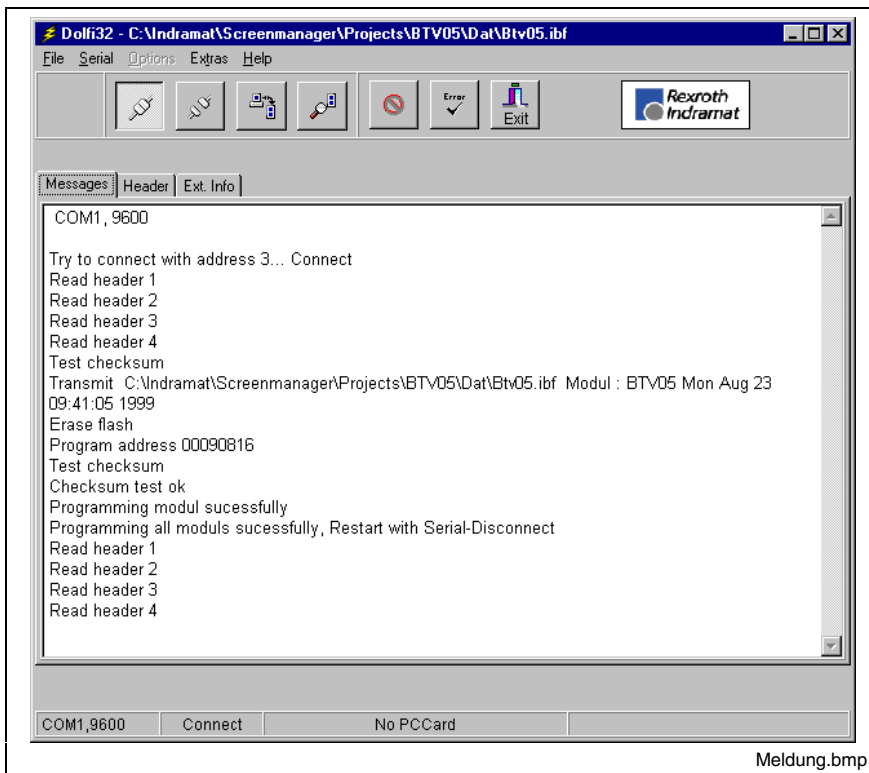


Fig. 8-3: INDRAMAT Flash tool "Dolfi"

Dolfi permits one out of three main windows to be selected: Messages Header and Extended Informations. Messages informs about the currently running operations and issues error messages (if there are any). The Header button displays information about the software loaded into the BTV unit and the contained bootloader.

Header Information

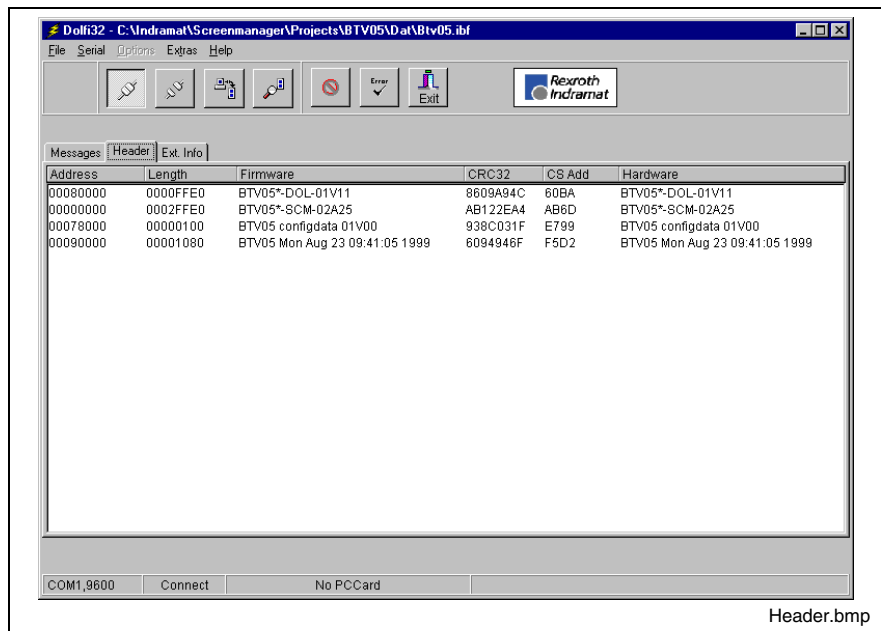


Fig. 8-4: Header list with four modules

After the connection has been established and the Option "Serial - Firmwareinfo" has been selected, the "Header" menu item shows the software and data modules that have been located in the BTV04 unit. Addresses, lengths, and hardware and software names are specified here at the same time.

Interface Settings

To establish communications, the serial COM2 interface of the unit is connected with a PC via the RS232 cable IKB0012. In addition, the matching selections for data transfer must be made. The „Options“ menu item permits the employed interface, the baud rate, the addresses, and the required language to be selected. The figure below shows the compatible settings for the BTV04 unit.

The standard baud rate for establishing the connection is always 9600 bits/s. For the BTV04 unit, the increased baud rate for the download is usually 38,400 bits/s.

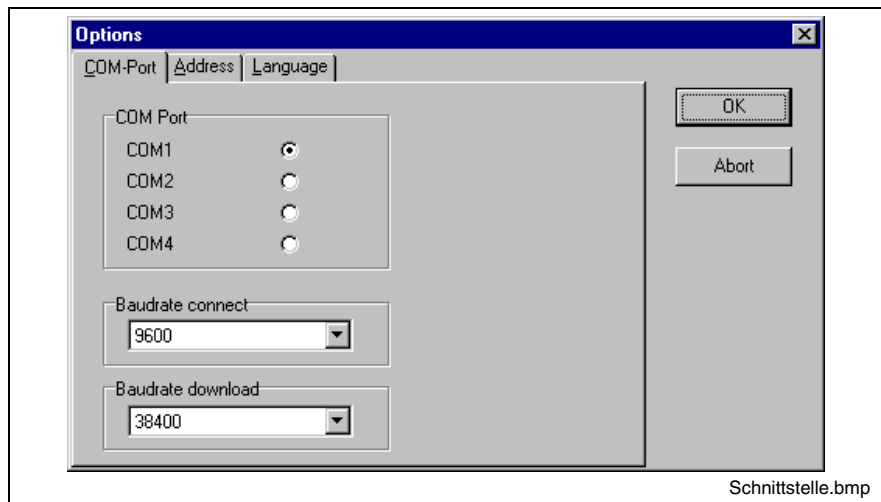


Fig. 8-5: Interface settings

With the BTV04 unit, the address selection is always receiver = 03 (default).

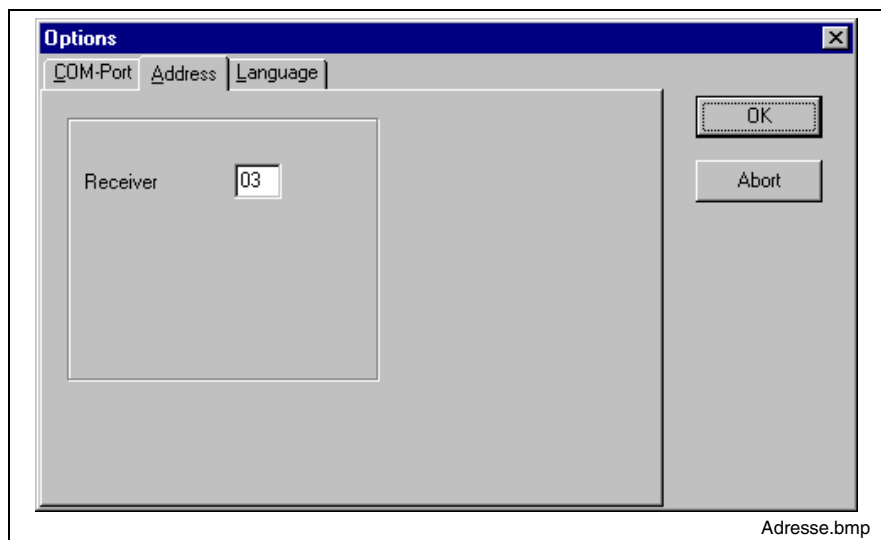


Fig. 8-6: Address selection

Reading Software from the BTV04 unit

The "Serial - Send" menu item starts a firmware loading process. A window is opened in which Dolfi enables the user to compare a previously loaded software with the new one. While "File info" shows the information about the selected file, "Module info" shows the information about the firmware found in the BTV04 unit. With the option "Backup" the file will be read out of the unit.

Note: This is the last opportunity of saving the software that is contained in the unit before a new software is downloaded from the PC. This must be done before a new software update is loaded.

This is the only possibility of loading the old file back into the unit if the new software does not work properly. The read file has automatically the extension '.BAK' assigned.

Loading Software

The "Serial - Send" menu item starts the firmware loading process. The software transfer begins when you select the "Send" option.

If the software that is displayed here is not the one you wish to load, abort the process and use "File/Open" to select and confirm the required IBF file. A window "FWA" is displayed now that contains information about the firmware. It is now possible to download the selected file. For this you must select the option "Send".

Note: If you wish to reload a saved file, you must select the file type 'All *.*' to make this extension visible. After a read process, you must start the download again via the corresponding icon.

The progress of the transfer is shown by the moving bar with percent indication at the lower screen margin and in the message window. The BTV04 unit shows a corresponding status information in the bottom screen line.

During the load process, the required area in the flash is cleared first, before the program is written to it. Once loading is completed, a CRC and addition checksum is verified. Dolfi shows the status of the transfer on the screen.

The "Disconnect" icon interrupts the connection between PC and BTV04 and starts the firmware in the unit.

8.4 Connecting cable IKB0012

The connecting cable IKB0012 make a RS232 communication between the BTV04 and a PC. The cable is used to load a software in the BTV04 by the Downloadtool Dolfi.

Cableplan of the IKB0012

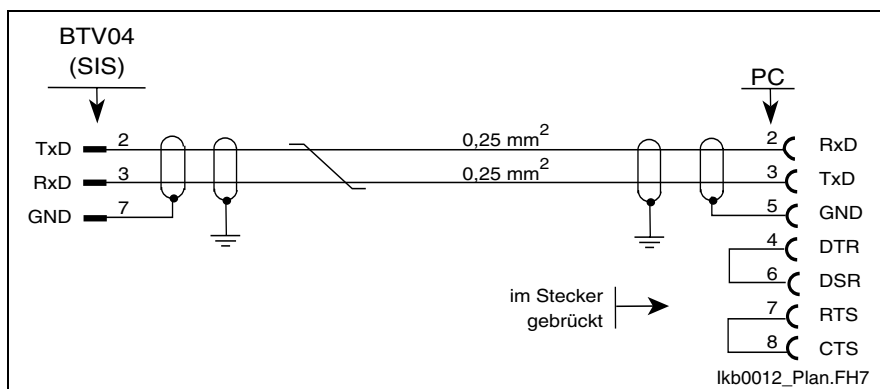


Fig. 8-7: Cable plan of the IKB0012

9 Ordering Information

9.1 BTV04 Type Code

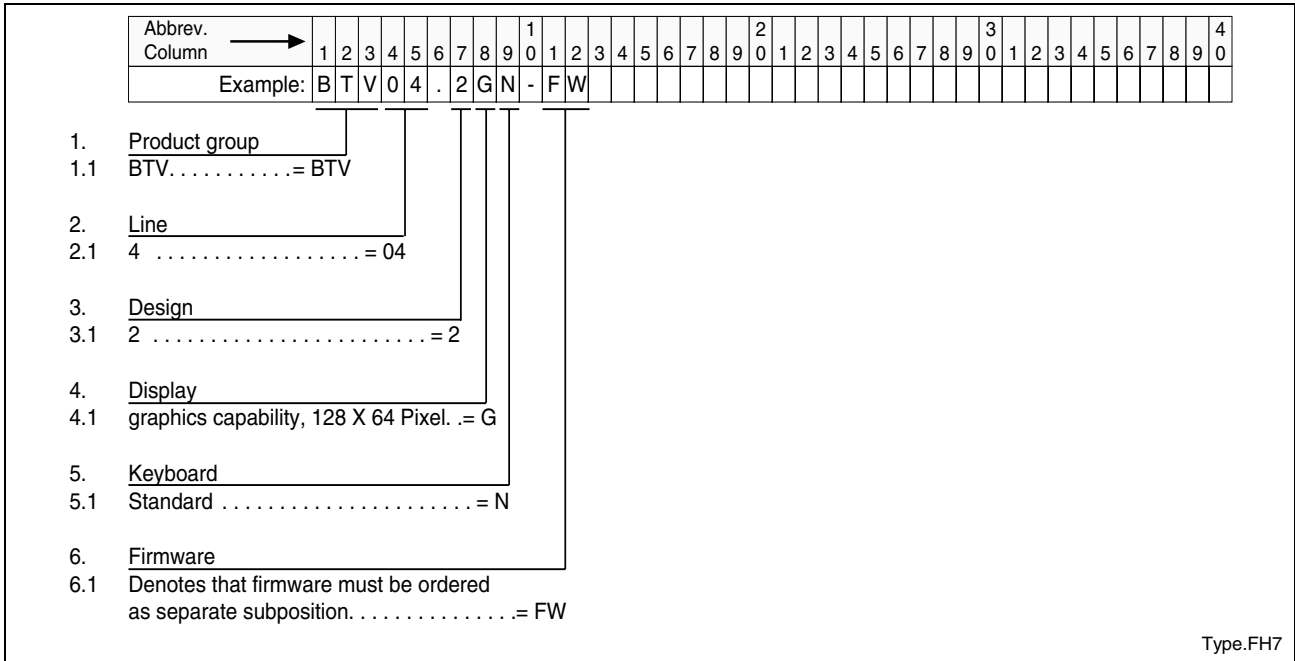


Fig. 9-1: BTV04 type code

9.2 Accessories

List of Connectors and Cable Sets

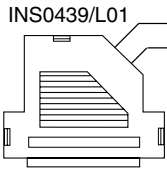
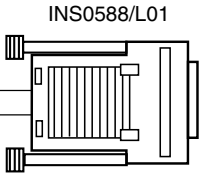
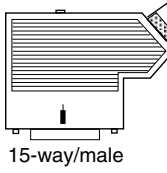
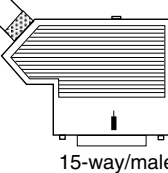
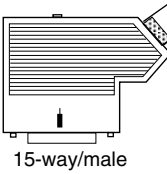
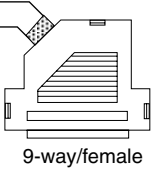
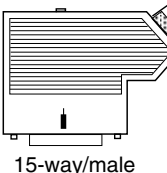

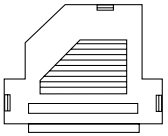
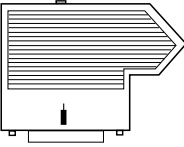
Order number of finished cable	Mating connector of the unit	INDRAMAT cable	Cable end
<p>IKB0012/000,0 MN: 281 715 (RS232, max 10m)</p>	 <p>INS0439/L01 15-way/male</p>	<p>INK0572</p>	 <p>INS0588/L01 9-way/female</p>
<p>IKB0017/000,0 MN: 282 872 (RS485, max 400m)</p>	 <p>INS0619/K01 15-way/male</p>	<p>INK0572</p>	 <p>INS0619/K01 15-way/male</p>
<p>IKB0018/000,0 MN: 282 874 (RS485, max 400m)</p>	 <p>INS0619/K01 15-way/male</p>	<p>INK0572</p>	 <p>INS0526/L01 9-way/female</p>
<p>IKB0019/000,0 MN: 282 875 (RS485, max 400m)</p>	 <p>INS0619/K01 15-way/male</p>	<p>INK0572</p>	 <p>Connector sleeve</p>
<p>INS0526/L01 MN: 259 762</p>	 <p>INS0526/L01 (9-way/femal)</p>	<p>Connector for building a connection with the MTS-P/MTS-R</p>	
<p>INS0619/K01 MN: 279 583</p>	 <p>INS0619/K01 RS485 (15-way/male)</p>	<p>Y connector for building cables with termination</p>	

Fig. 9-2: Connectors and cable accessories of the BTV04

Software

Performance / Control	Software designation
ScreenManager for: MTS/P, MTS/R, CLC	SWA-BTV04*-SCM-01VRS-MS (Runtime) SWA-BTV04*-SCM-02VRS-MS (Runtime) SWA-BTV04*-SCM-03VRS-MS (Runtime) SWA-BTV04*-SCM-04VRS-MS (Runtime) SWA-SCM*PC-INB-04VRS-MS (PC-programming tool)
Download tool Dolfi for PC	SWD-DOL*PC-INB-01VRS-MS-C1,44

Fig. 9-3: BTV04 Software

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Use *See appropriate use and inappropriate use*

12 Service & Support

12.1 Helpdesk

Unser Kundendienst-Helpdesk im Hauptwerk Lohr am Main steht Ihnen mit Rat und Tat zur Seite. Sie erreichen uns

- telefonisch: **+49 (0) 9352 40 50 60**
über Service Call Entry Center Mo-Fr 07:00-18:00
- per Fax: **+49 (0) 9352 40 49 41**
- per e-Mail: **service@indramat.de**

Our service helpdesk at our headquarters in Lohr am Main, Germany can assist you in all kinds of inquiries. Contact us

- by phone: **+49 (0) 9352 40 50 60**
via Service Call Entry Center Mo-Fr 7:00 am - 6:00 pm
- by fax: **+49 (0) 9352 40 49 41**
- by e-mail: **service@indramat.de**

12.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

+49 (0) 171 333 88 26
oder **+49 (0) 172 660 04 06**

After helpdesk hours, contact our service department directly at

+49 (0) 171 333 88 26
or **+49 (0) 172 660 04 06**

12.3 Internet

Ergänzende Hinweise zu Service, Reparatur und Training sowie die **aktuellen** Adressen unserer Service- und Vertriebsbüros finden Sie unter **www.indramat.de** – einige Angaben in dieser Dokumentation können inzwischen überholt sein.

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit Ihrem lokalen Ansprechpartner auf.

- Verkaufsniederlassungen
 Niederlassungen mit Kundendienst

Additional notes about service, repairs and training as well as the **actual** addresses of our sales- and service facilities are available on the Internet at **www.indramat.de** – some information in this documentation may meanwhile be obsolete.

Please contact the sales & service offices in your area first.

- sales agencies
 offices providing service

12.4 Vor der Kontaktaufnahme... - Before contacting us...

Wir können Ihnen schnell und effizient helfen wenn Sie folgende Informationen bereithalten:

1. detaillierte Beschreibung der Störung und der Umstände.
2. Angaben auf dem Typenschild der betreffenden Produkte, insbesondere Typenschlüssel und Seriennummern.
3. Tel./Faxnummern und e-Mail-Adresse, unter denen Sie für Rückfragen zu erreichen sind.

For quick and efficient help, please have the following information ready:

1. Detailed description of the failure and circumstances.
2. Information on the type plate of the affected products, especially type codes and serial numbers.
3. Your phone/fax numbers and e-mail address, so we can contact you in case of questions.

12.5 Kundenbetreuungsstellen - Sales & Service Facilities

Deutschland – Germany

vom Ausland:

(0) nach Landeskennziffer weglassen!

from abroad:

don't dial (0) after country code!

<p>Vertriebsgebiet Mitte Germany Centre</p> <p>Rexroth Indramat GmbH Bgm.-Dr.-Nebel-Str. 2 97816 Lohr am Main</p> <p>Kompetenz-Zentrum Europa</p> <p>Tel.: +49 (0)9352 40-0 Fax: +49 (0)9352 40-4885</p>	<p>SERVICE</p> <p>CALL ENTRY CENTER MO – FR von 07:00 - 18:00 Uhr from 7 am – 6 pm</p> <p>Tel. +49 (0) 9352 40 50 60 service@indramat.de</p>	<p>SERVICE</p> <p>HOTLINE MO – FR von 17:00 - 07:00 Uhr from 5 pm - 7 am + SA / SO</p> <p>Tel.: +49 (0)172 660 04 06 oder / or Tel.: +49 (0)171 333 88 26</p>	<p>SERVICE</p> <p>ERSATZTEILE / SPARES verlängerte Ansprechzeit - extended office time - ♦ nur an Werktagen - only on working days - ♦ von 07:00 - 18:00 Uhr - from 7 am - 6 pm - Tel. +49 (0) 9352 40 42 22</p>
<p>Vertriebsgebiet Süd Germany South</p> <p>Rexroth Indramat GmbH Landshuter Allee 8-10 80637 München Tel.: +49 (0)89 127 14-0 Fax: +49 (0)89 127 14-490</p>	<p>Gebiet Südwest Germany South-West</p> <p>Bosch Rexroth AG Vertrieb Deutschland – VD-BI Geschäftsbereich Rexroth Indramat Regionalzentrum Südwest Ringstrasse 70 / Postfach 1144 70736 Fellbach / 70701 Fellbach</p> <p>Tel.: +49 (0)711 57 61-100 Fax: +49 (0)711 57 61-125</p>	<p>Vertriebsgebiet Ost Germany East</p> <p>Bosch Rexroth AG Beckerstraße 31 09120 Chemnitz</p> <p>Tel.: +49 (0)371 35 55-0 Fax: +49 (0)371 35 55-333</p>	<p>Vertriebsgebiet Ost Germany East</p> <p>Bosch Rexroth AG Regionalzentrum Ost Walter-Köhn-Str. 4d 04356 Leipzig</p> <p>Tel.: +49 (0)341 25 61-0 Fax: +49 (0)341 25 61-111</p>
<p>Vertriebsgebiet West Germany West</p> <p>Bosch Rexroth AG Vertrieb Deutschland Regionalzentrum West Borsigstrasse 15 40880 Ratingen</p> <p>Tel.: +49 (0)2102 409-0 Fax: +49 (0)2102 409-406</p>	<p>Vertriebsgebiet Mitte Germany Centre</p> <p>Bosch Rexroth AG Regionalzentrum Mitte Waldecker Straße 13 64546 Mörfelden-Walldorf</p> <p>Tel.: +49 (0) 61 05 702-3 Fax: +49 (0) 61 05 702-444</p>	<p>Vertriebsgebiet Nord Germany North</p> <p>Bosch Rexroth AG Walsroder Str. 93 30853 Langenhagen</p> <p>Tel.: +49 (0) 511 72 66 57-0 Fax: +49 (0) 511 72 66 57-95</p>	<p>Vertriebsgebiet Nord Germany North</p> <p>Bosch Rexroth AG Kieler Straße 212 22525 Hamburg</p> <p>Tel.: +49 (0) 40 81 955 966 Fax: +49 (0) 40 85 418 978</p>

Europa (West) - Europe (West)

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